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THE CAUSAL RELATION BETWEEN MIND AND BODY

I

ALL readers of this JOURNAL will recall William James's description of the diverse "Worlds of Reality" in his larger "Psychology,"[1] and will remember that he refers in some detail to seven such worlds: the worlds (1) of sense, or of physical "things" as we instinctively apprehend them; (2) of science, or of physical things as the learned conceive them; (3) of ideal relations; (4) of "idols of the tribe"; (5) of the supernatural; (6) of individual opinion; (7) of madness. "Every object we think of," he tells us, "gets at last referred to one world or another of this or some other list." To the "worlds" in his list, I would add the important "worlds"; (8) of immediate experience as introspectively recalled; and (9) of "reflection upon this immediate introspective experience"; as well as (10) the "world of dreamland"; and (11) the "make-believe world of imaginative discourse."

In this manner of thought it is apparent that James was not dealing with the concept of reality, but rather with the appreciation of realness, or presentative stability, upon which this concept of reality is based; and for this reason I have suggested[2] that we gain a better idea of his meaning if we speak of diverse "realms of realness" instead of "worlds of reality" as he did; for the significance of the point he made lies in the fact that given mental items, or presentations, may be included in more than one of these realms, "the whole distinction of real and unreal," as he says,[3] "the whole psychology of belief, disbelief, and doubt" being "grounded on two mental facts;—first, that we are liable to think differently of the same" (mental items); "and secondly, that when we have done so, we can choose which way of thinking to adhere to and which to disregard."

[1] Vol. II., pages 291 ff.
[2] "Consciousness," pages 231 ff.
[3] *Op. cit.*, page 290.

In other words these diverse realms of realness are in fact diverse noetic systems in which certain specific mental items appear, and are of such a nature that what we call "the same" mental items may appear in several systems, and may be real in one system while very unreal in another.

That these worlds are as diverse as James teaches is not always evident. To be sure it becomes apparent that his statements are justified when, for instance, we compare the "world of dreamland," or the "world of imaginative make-believe," with the "world of sense" of every-day waking experience: or when we compare this latter world of every-day experience with what James called "the world of ideal relations, or abstract truths believed or believable by all": or again, when we compare this "world of sense" with that of "immediate experience as introspectively recalled," or with that of "reflection upon this immediate introspective experience." But it is not so evident that a significant diversity exists between the "world of sense, or of physical things as we instinctively apprehend them," and the "world of science, or of physical things as the learned conceive them." In fact these two "worlds" do not seem to the average scientist to be separate worlds at all; and even when, led by such suggestions as that given by James, he begins to consider them as diverse, he is likely to think of the "world of science" merely as a purer form of the "world of sense."

That the diversity of these two worlds is thus overlooked is accounted for, as we shall presently see, by the fact that there is a very special bond between the two. Nevertheless if we study their natures with care we soon become convinced that they are justly judged to be as diverse as any of the other worlds above referred to.[4]

[4] The diversity between the "world of science" and the "world of sense, or of physical things as we instinctively apprehend them," is clearly seen when we consider the concept of mechanism in the form in which it is generally accepted in our day, and which dominates our "world of science."

This concept of mechanism is evidently one that is based primarily upon the study of motions of inorganic bodies and has become established because it serves our purpose in coordinating many situations observable in the material world in which we live; and in maintaining it in relation to the inorganic world we choose to overlook many of the characteristics observable in these natural bodies and their relations as they are given in the "world of sense."

For instance, because it serves our purpose in taking this view, we choose to assume the existence of an ethereal medium, and agree to overlook the fundamental contradictions involved in the very nature of this medium as conceived, as well as the fact that its characteristics transcend, and are even incompatible with, experiences that are familiar to us in our observation of the "world of sense." In like manner we choose to overlook the difficulties connected with the conception of potential energy and with the distinction between kinetic and

II

As James says, the whole distinction of real and unreal is grounded upon the fact that these diverse "worlds" exist; that what we call "the same" mental items may appear in two or more different "worlds"; and that these mental items may be very real in one "world" while very unreal in another. The ether which is very real in the "mechanistic world" of the physicist is quite unreal in the "world of sense," if judged by the canons of every-day experience. The rising of the sun is very real in the "world of sense," but very unreal in the astronomer's "world of science." Certain items, and the relations between them, appear fully real in our "dreamland world," and in the "make-believe world" of the constructive imagination, which would be cast aside instantly as unreal in the world of every-day experience.

Such being the case, it seems clear that we can not properly draw conclusions in one "world" from premises in a diverse world; nor employ concepts derived from data given in one "world" within a quite diverse "world," without logical danger.

potential energy, which latter can not be said to be more than a name devised to describe the absence of all signs of energy. Again we choose to overlook the problems relating to the basis of the transformation of energy from potential to kinetic forms, and *vice versa*, as well as the more fundamental problems arising when we attempt to account for the existence of diverse forms of energy, and look for the basis of the transfer from one form to another. Beyond this we overlook the difficulties connected with the assumption of a closed energetic system, as well as those connected with the assumption of a beginning of the conditions that have led to present situations.

All these are difficulties and inconsistencies overlooked when we build up the quite artificial "world of mechanism" as a mode of interpretation of the phenomena observed in the inorganic world. When we turn to the study of organic life we again note motion followed by motion, and are again tempted to take a mechanistic view. But a new difficulty arises here in the fact that vital energy appears diverse from all other forms of energy. Even if this vital energy is finally shown to be resolvable into the forms found in the inorganic world, which have given rise to the mechanistic conception, the same problems above referred to in considering that conception must be overlooked if we are to make the conception work, and a new one in connection with the attempt to account for the basis of the rise of the vital energy form. In organic life, moreover, we find a new formidable difficulty in the existence of the capacity of inheritance; but especially of the capacity of variation involved in the development of one form from another, which, as Stout says, is as important a fact as inheritance.

All this shows that we are dealing with a very artificially restricted conception when we picture the universe in terms of energy, or of motion followed by motion. In other words, we are choosing to dwell, for the time being, not in the "world" of every-day experience, but in what, from the standpoint of this every-day experience, is a "make-believe world," just as much as the imaginative "world" of "Alice in Wonderland" and the "world" of the shadow pantomime are "make-believe worlds."

When we witness a shadow pantomime we live for the time being in a "world" where real situations do not correspond with real situations in the "world of every-day experience," and we should not for a moment think ourselves warranted in concluding, because the shadow girl allows the shadow man to kiss her, that the physical-object girl would permit such a liberty. Or taking a more serious case, we may note how impossible it is to make proper conclusions in the "world of introspective observation" from premises in the "metaphysical world." In the latter, pain and error may be looked upon as unreal by the absolutist, while "the same" pain and error in the "world of introspective experience" can not be held to be unreal. The error of the Christian Scientist lies in the fact that, half grasping the absolutist doctrine in a "metaphysical world," he jumps therefrom to conclusions in the "world of introspective experience."

Inasmuch as the concepts developed in any one "world" are based upon the appreciation of relations that are found real in that "world," I think it will be granted also that concepts which are developed in any one special "world" can not be transferred to, and made applicable within, a diverse "world" without risk of confusion of thought. As I shall attempt to show in the sequel, we take just such a dangerous step when we attempt to apply the concept of causality to the relation between mind and body.

III

It seems to me clear, notwithstanding the views of eminent thinkers to which I refer below, that the concept of causality arises primarily in connection with our naïve observation of natural phenomena; that it is, in other words, a concept belonging primarily to the "world of sense." One object strikes another that is stationary; the latter then moves; the former loses its motion in whole or in part. The motion of the first object is thought of as bound up with, and the basis of, the motion of the second. The experience of an innumerable number of facts of this nature leads to the development of the concept of cause.

From the "world of sense" develops the "world of science" and within it the "world of mechanism"; and although this newly found "world" is, as we have seen, diverse from the "world of sense," nevertheless in it the same order of occurrences appears which originally yielded the concept of cause. And in this "world of mechanism" this causal concept becomes of very fundamental importance. In the "world of sense" attention is given to many other than causal relations, which latter are only occasionally noted. The

"world of mechanism," on the other hand, excludes all forms of experience to which it is impossible to apply this causal concept, a fact which becomes more and more significant as the structure of science becomes more complex. The causal concept thus serves as a most powerful bond between the "world of sense" and the "world of mechanism," and the "world of science" in general; and its importance is thus greatly emphasized.

It is to be noted that, whether applied in the "world of sense" or in the "world of science," this causal concept arises in connection with what we call our objective view of experience.

When we turn to what we call the subjective view of experience, we enter, as we have seen, a "world" quite diverse from the "world of sense" and equally diverse from the "world of science"—enter, in other words, the "world of immediate experience as recalled," from which develops the "world of reflection upon this immediate experience."

In these new "worlds" we should naturally expect to note the development of certain concepts quite diverse from those developed in the "worlds" of sense and of science, and this expectation we find realized.

In the "world of reflection upon immediate experience," which we describe as the field of introspective observation, we discover volitional experiences which yield a concept which we may speak of as the concept of efficiency.

This efficiency concept is clearly not derived from data found in the "worlds" of sense or science, within which the primal concept of cause appears. Nevertheless, when we objectify the whole situation we note that the experience of efficiency often occurs together with motions of our bodies, which in turn move objects just as they are moved in the world of physical objects. Hence this concept, which I here call efficiency, becomes closely bound up with the causal concept, and, as we shall presently see, is not uncommonly thought to be of its very essence—so much so indeed that the term causation is very frequently used as though it were identical with the term efficiency.

Using the term efficiency thus, and because of the observed relation above noted, we are led to make a false step, carrying the concept of efficiency, which properly belongs only to the world of introspective observation, over into the diverse world of physical objects, and conceiving of efficiency as part and parcel of causation in the physical world. Thus by a failure to keep clearly before us the diversity of the objective and subjective "worlds" we come to attach the term causality to the experience of efficiency, on the one hand,

and, on the other hand, come to think of this experience of efficiency as of the very essence of the causal concept.

To take such a position as is thus outlined may seem somewhat audacious, when it is considered how many keen thinkers have upheld the doctrine that, but for the sense of efficiency correlated with successive movements, we would never have conceived of any such thing as a cause. Thus Dr. James Ward tells us[5] that "the source and primary meaning" of cause is found "unquestionably in ourselves as active and efficient."

Nevertheless I must be bold in the assertion that this view appears to me to be untenable; for if I read experience aright, we are perfectly capable of entertaining the conception of cause in nature without attaching to it any attribute of efficiency whatever. For instance, I do not find this sense of efficiency bound up with my notion of the causal relation between the activities within the sun and the conditions of motion upon the earth. It is only as we approach realms closely allied with those which are distinctly related to the direct activities of man himself that the sense of efficiency becomes bound up with the notion of cause by the process above referred to; and surely, if we examine the evidence critically, we find in our experience of nature no evidence whatever of what we call efficiency when we speak in terms of immediate experience.

The distinction between these two concepts of cause and efficiency stands out more distinctly when we consider that the causal concept as derived from the observation of nature, and quite apart from the concept of efficiency, depends for its existence, as Hume taught us, upon the appreciation of what, when clearly defined, appear, as J. S. Mill puts it, as "ideas of invariable, certain, and unconditional sequence."

On the other hand, so far as I can see, the concept of efficiency *in the world of introspective observation* is not resolvable into "ideas of invariable, certain, and unconditional sequence."

It is of course a matter of fact that we do in every-day conversation speak of mental states as the cause of physical states, and *vice versa*. But we must note that we all very commonly apply the concept of cause where we have no right whatever to do so. The average man is restive when he finds it difficult to account for any situation that baffles him, but at once rests satisfied if he can attribute it to anything that he can call a cause. It has been said that the inhabitants of the Bahama Islands believe the Gulf Stream does everything but milk their cows. The other day the laundress of one

[5] "The Realm of Ends," page 273.

of my friends, having been spoken to sympathetically of the fog on a "washing day," remarked with satisfied complacency "How can you expect anything else when everybody tries to dry their clothes on the same day?"

It is true that we should not apply the concept of cause to the relation of mind and body did we not find some measure of similarity between the experiences involved and the causal succession in nature, and we may grant with Hume that so far as we apply the concept of causation to the relation of mind to body we do so as the result of judgments based upon the experience of successions. But this is quite apart from the point I would here make. What I am concerned to argue is that the concept of efficiency is derived from data given wholly in the mental field as immediately experienced, in which we gain none of the characteristics from which the concept of physical causation is developed.

It is true, as Hume argued, that when we consider ourselves as active, as doing something, and think of our volitions as causes of bodily movements, we are dealing with mere successions,—successions which must be judged to be invariable and unconditional if we are to justify ourselves in speaking of the volitions as the causes of the bodily acts. But I submit that when we think thus of this "sense of doing something," we objectify the whole situation. We think of our "sense of doing something" as "out there," exactly as if it were the "sense of doing something" thought of as belonging to another man in the objective world, rather than within our own introspective experience. And we then carry over into this objectified mental field the causal concept derived from the "world of sense."

This is natural enough when one considers our reckless attribution of cause above referred to, and is a common procedure in the careless life of the average man, and of the philosopher when he lays aside the attitude of the thinker and becomes an average man. The trouble arises however when the philosopher, as a thinker, assumes that he is justified, not only in carrying over the causal concept into this objectified mental field, but also in carrying it over into the non-objectified field of immediate experience. It is one thing to apply the term cause where we note mere physical-mental or mental-physical sequences, following the habit of the common man who thoughtlessly applies the causal relation whenever he notes sequences. It is quite another thing to show the warrant for this application of the causal concept, if we agree that it can only properly be applied when sequences are recognized to be "invariable, certain, and unconditional."

If the position thus taken is warranted, then clearly, when we ask whether the mind can act causally upon body, or body act causally upon mind, we must use care in distinguishing the diverse meanings attributed to the word causation.

Activities of body when considered *quite objectively,* as may be done in our study of the behavior of animals without any assumption of consciousness due to our observation of the analogy between them and ourselves, appear as part of the mechanistic system, within the "world of science." Here, causation, in the sense of invariable unconditional succession, may be held to apply. But the concept of efficiency does not at all clearly apply: for, if we strictly maintain the objective attitude we have no evidence whatever of the existence of mind in connection with this objective study of behavior.

When, on the other hand, we consider changes in consciousness as such, we find that the concept of efficiency does apply, while the concept of causation in the sense of unconditional invariableness of succession does not at all evidently apply.

It must be constantly borne in mind also that when we consider this question we are not dwelling within the "world of physical objects" which gives us the conception of causality as invariable unconditional sequence, nor within the "world of introspective experience" which gives us the concept of efficiency, but in a realm of realness quite diverse from both. Thus, in applying the concept of causality to the mental and physical items in this new "world," we are attempting to carry over into it a concept derived from the one or the other of the diverse worlds first mentioned. The question is whether we have any right to take this step—a question which can not fail to be raised if one bears in mind the radical difference above noted between the meaning attributed to causation in the realm of body and in the realm of mind.

IV

In taking up the consideration of this question we must note in the first place that it is necessary to avoid an obvious error made by the average man, who is wont to think that the mind sometimes acts causally upon the body and that sometimes the body acts causally upon the mind. We seem bound to reject any such haphazard and dubious relation, and to ask two questions; viz., first, whether we are warranted in holding that the mind always or sometimes acts causally upon the body, and, secondly, whether the body sometimes or always acts causally upon the mind. And we are also called upon to consider each of these questions in relation with the two concepts above considered, viz., that of causation proper derived from our

objective observation of the world of objects, and that of efficiency derived from our reflection upon introspective experience which is held by many to be of the essence of the causal concept.

Let us take up first the concept of causation as it is thought of by those who hold that it is derived from our experience of efficiency. If under this view we hold that a bodily state is in any case the cause of a mental change, we are compelled to assume in physical nature the existence of an efficiency of which we have no evidence whatever.

If, on the other hand, we hold in any case that a mental state causes a bodily act, we hold that the bodily act was due to the efficiency component of the mental state. It is difficult, however, to bring such a tenet into harmony with the phenomena of habit, where we note that acts, which are at first preceded by mental states which involve this sense of efficiency, if repeated, soon follow the occurrence of mental states which do not involve this sense of efficiency, and are finally performed without the occurrence of any recognizable, antecedent, correlated mental states whatever.

If now we take the term causation in the sense applicable to our observations of the external world, we can apply it to the relation between mind and body only by showing that we have reason to believe that certain special mental changes follow invariably and unconditionally certain special physical changes; or that certain special physical changes follow invariably and unconditionally certain special mental changes.

We do note certain mental changes which in repeated instances appear to follow certain changes of bodily activities; but we surely are not warranted in saying that these sequences are invariable and unconditional. The cutting of superficial nerves is often in our experience followed by a marked painful sensation; but that this succession is not invariable or unconditional appears clear when we note that the soldier in the heat of battle often fails to appreciate the fact that he has received a superficial wound; this being an example of the influence of what we call a change of "threshold" of awareness.

In like manner we do note certain bodily changes which in repeated instances appear to follow certain mental changes; but we surely are not warranted in saying that these sequences are invariable and unconditional. Grief is so often followed by ill-health that we carelessly speak of the former as the cause of the latter, but the sequence is really not invariable or unconditional. Volitional experience does not always prevail to overthrow, or even to modify, habitual activities.

Surely then, whether we hold that mind acts on body, or body on mind, we are bound to agree that it is impossible to hold that the succession of changes is unconditional even where it appears to be invariable. Under such conditions, in the "world of sense," and, its development, the "world of science," from which the concept of causation here considered is derived, we are led, not to the attribution of a direct causal relation between the two successive phenomena, but to the postulation of a causal influence beyond both; as the invariability of the sequence of night and day are appreciated to be conditioned by something in nature extrinsic to them. We may in the end find ourselves compelled to postulate some cause as the determinant of the observed relation of correspondence between mental and physical changes, but this does not imply that we are forced to apply the causal concept to the mental-physical relation itself.

It may be remarked in passing that if we deny ourselves the luxury of occasional leaps from the realm of introspective observation into the realm of physical objects, which is the "world of reality" of every-day life, or *vice versa,* and if we persistently cling strictly to the realm of introspective observation, then nerve activities, and all other objects in the outer world, appear as complex systematized psychic systems, or as complex emphases within consciousness, fundamentally of the same nature as those spoken of as distinctly mental. In such a view the neururgic-noetic correspondence appears as a correspondence quite within consciousness, and presents a problem quite diverse from that to which the concept of causality applies.

V

Assuming that the validity of the application of the concept of causality to the relation between mind and body is open to grave question, nevertheless as it is, in fact, thus applied by the average man, we should not be surprised, after what has been said above, to find that he comes to look upon this causal relation as a thoroughly haphazard and lawless one, although we may well wonder that thinkers do not protest against such inconsistency. Few of us indeed can claim to be free from such a charge. We are usually quite content to say that sometimes the mind acts upon the body and sometimes it does not; and, on the other hand, that sometimes the body acts upon the mind and sometimes it does not. We say for instance that indigestion, which is a physical state, gives my friend "the blues," which is a mental state; but we do not seem to think that any physical state causes such a mental state as an act of will. We say that a noise, which is a mental state, makes our friend jump, the

jumping being clearly a change of physical state; but we do not seem to think that any antecedent mental state causes the winking of his eyelids, or the throbbing of his heart, which are also physical states.

But this difficulty disappears altogether if we look away from this causal relation and concentrate our attention upon the correspondence between mental and body changes; for then we find much evidence that there is a thorough-going correspondence between successions of neururgic and noetic changes which enables us to account for the relation of mind and body in a manner freed from the acceptance of haphazardness and lawlessness.

Under such a view certain changes in the nature of the activities within the nervous system are held to be coincident with the appearance of certain specific mental items. There thus appears to be a correspondence between neururgic and noetic forms, and evidence of the breadth of this correspondence increases as our knowledge of nerve activity increases. Furthermore, if we assume that the correspondence is thoroughgoing in the individual, we are enabled to correlate many phenomena in mental fields, such correlation being suggested by noticeable correlations in neururgic fields. This theory of thoroughgoing correspondence being thus corroborated, if carried to what appear to be its legitimate conclusions, indicates, first, that there is psychic existence wherever there is life; and finally, that to all transfer of energy some psychic change corresponds.[6]

Now what we have to deal with in connection with this theory is merely corresponding successions in both the neururgic and the noetic series, and, if we approach our problem from this standpoint, we find the interpretation of the facts concerning the relation of mind to body, which are usually made in terms of causation, thoroughly well interpretable without any such use of this causal concept, provided we accept the view that there is a psychic field of non-awareness, a view in favor of which we have much cogent evidence.

In closing, then, let us consider a few cases to illustrate how the apparent haphazardness and lawlessness of the relation between mind and body disappear if we interpret this relation in terms of correspondence rather than in terms of causation.

If I were to walk up behind a man and discharge a pistol close

[6] This I call the theory of neururgic and noetic correspondence to differentiate it from the theory of parallelism which was devised by the atomistic psychologists, and which fails in many directions. The theory of correspondence, however, so far as I can see, meets these difficulties in assuming that changes in a psychic *system* correspond with changes in the physical *system* as differentiated in the nerve system.

to his ear he would jump aside suddenly and would be likely to describe the occurrence by saying "the noise made me jump." The noise is a psychic state, while the jump is due to certain active muscular states occasioned by changes in the nervous system. His description therefore implies that the psychic state (the noise) in some mysterious way caused the physical change (the jump).

But if we consider the case merely as an instance of coordinate successive occurrence the mystery seems at once to disappear. The psychic change, which we call the noise, was accompanied by a change of nerve condition, and in like manner the jump, which was due to certain nerve activities, was accompanied by certain "instinct feelings" quite within the mental order. What happened may therefore be formulated as follows:

Mental series ..... (*A*) Noise, followed by (*B*) "instinct-feeling."
Corresponding
physical series ... (*X*) Nerve change, followed by (*Y*) jump.

But in his description of this occurrence the average man overlooks the nerve change *X* and also the instinct-feeling *B*, so that he thinks of the jump as due to the noise rather than to the overlooked nerve change *X*. When the situation is stated in the terms above used this occurrence surely seems quite natural and not especially involved in mystery.

Or let us take another commonplace case. The ordinary man is likely to say of one of his friends "His deep grief (mental state) made him ill (nerve situation)."

If the occurrence thus described is formulated as above we have:

Mental series ..... (*A*) Grief, followed by (*B*) a mental state (overlooked).
Corresponding
physical series ..... (*X*) Nerve situation (overlooked), followed by (*Y*) illness.

In his description of this occurrence the ordinary man overlooks the nerve change *X* and also the psychic change *B*, so that he thinks of the illness as due to the grief rather than to the depressed nerve condition accompanying this grief.

So again you may hear some one say "My act of will (mental state) made my arm move (physical state)." But if we state this in terms of a similar formulation we have:

Mental series ..... (*A*) Will-act followed by (*B*) a mental state (overlooked).
Corresponding
physical series ..... (*X*) Nerve change (overlooked), followed by (*Y*) arm movement.

In the ordinary description of this occurrence the nerve change (X) corresponding with the will-act (A) is overlooked as is also the psychic change (B) corresponding with the arm movement (Y), so that the arm movement is thought of as due to the appreciated will-act rather than to the nerve condition that accompanied this will-act.

The commonplace remark about willing to move one's arm is closely allied with similar remarks made by a very large number of people in these days whom you are accustomed to hear say "I willed to be cured and I am now well"; or in other words "my will-act (mental) gave me good health (physical)."

If this is formulated as above it reads as follows:

Mental series ..... (A) Will-act, followed by (B) mental conditions (overlooked).
Corresponding
physical series ... (X) Nerve changes (overlooked), followed by (Y) good health.

In the ordinary description of this occurrence the nerve change (X) corresponding with the will-act (A) and also the mental state (B) corresponding with good health (Y) are overlooked, so that the restored health is thought of as due to the will-act rather than to the resultants of the nerve changes corresponding with this will-act.

The same people who tell us that they regain their health by will power are likely to say: "By an act of will I can make pain disappear." If the occurrences upon which they base such a broad statement are formulated as above, we have:

Mental series ..... (A) Will-act, followed by (B) loss of pain.
Corresponding
physical series ..... (X) Nerve change (overlooked), followed by (Y) nerve change (overlooked).

Here the nerve changes that accompany both the act of will and the loss of pain are overlooked, so that the person who speaks thus is *aware of* merely (A) the will-act (mental) followed by (B) loss of pain (mental).

It is true that in some cases the will-act is followed by disappearance of pain; which merely means that the nerve situation accompanying a particular will-act is followed by special nerve conditions whose psychic correspondents involve no pain. We have, however, no evidence to warrant us in holding that the sequence is invariable and unconditional, and that therefore the causal concept is applicable. In other words we have no adequate evidence to war-

rant us in holding that the nerve state accompanying the will-act is in all cases followed by the healthy physical state which carries with it this loss of pain. That is to say, the experience above described gives us no ground for the belief that if a man has sufficient "will power" he can always remove the unhealthy conditions which yield pain.

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LITERARY SYNESTHESIA

READING the literature of synesthesia one is frequently impressed by the poetical value of many of the sense-analogies reported. It would seem that this aspect of the topic has been particularly interesting to the French investigators of the subject, so that, in conjunction with the more strictly scientific reports of such cases, they have given us an exposition of them from the standpoint of musical and literary criticism. French poets have themselves manifested their interest in synesthetic experiences and have not hesitated to utilize such material in enhancing poetic expression. One recalls Max Nordau's unhesitating condemnation of the attempt to confound sense-qualities and his inevitable conclusion that such exchange of adjectives is only a fantastic straining after novelty of effect, or, if rooted in actual experience, a confession of degeneracy.

Psychologically, the attempt to treat together cases of true synesthesia, in which sensations of a given sensory quality regularly and uniformly arouse sensations of another sensory tone, and cases of so-called colored thinking or the employment of sense-analogies in a figurative or reflective way, has induced some confusion. Each of these topics is undeniably interesting and may be related to the other in ways not yet thought of, but at present each demands separate treatment.

We may then legitimately ask (1) to what extent true synesthesia is to be found among poets, recognizing this question as distinct from that which asks (2) the esthetic value of an exchange of sense-qualities and the extent to which such transfer is employed by imaginative writers. The objection may, however, be raised that, apart from a personal examination of a given poet, it would be impossible to answer the first question, for in appeal for answer to the poet's works we can not with certainty distinguish between spontaneous and deliberate analogies. The objection is undoubtedly well taken. None the less, the attempt to answer the question allures one. It seems scarcely possible, for instance, that a poet, who experienced a sys-

tematic case of colored audition, in whom, that is, sound uniformly and constantly aroused color, would fail to show this peculiarity in descriptive writing.

The question as to the prevalence of synesthesia among poets aroused the interest of Bleuler and Lehmann in their early report on synesthesia to such an extent that an examination was made of certain literary material, but largely with negative result.

French literature, on the other hand, raises many questions as to the possibility of poets' experiencing synesthesia to an undue degree. Every one will recall Rimbaud's "Sonnet of the Vowels," which, it must be confessed, sounds somewhat sophisticated. Baudelaire's insistence upon sense-correspondences and Maupassant's confessions are scarcely more convincing. Leaving, however, the French poet and litterateur to the mercy of the French critic and psychologist, I have found it interesting to make a somewhat detailed study of certain English poets in order to determine whether or not their poetry shows any evidence of systematic or sporadic arousal of one sensation by another.

Only one unambiguous case was discovered. Poe, singing of the sound of the coming darkness, adds in a footnote to "Al Aaraaf": "I have often thought I could distinctly hear the sound of the darkness as it stole over the horizon." This simple and apparently isolated case of tonal vision is in interesting contrast to the more usual feeling of silence that so frequently steals upon one at sundown.

After this one attested instance, Swinburne's poetry furnishes the best evidence for a possible synesthesia. It is Swinburne's peculiarity to deal with simple sense-qualities in an abstract and emotional way with results very unlike the plastic and pictorial effects produced by poets of another type. As Woodberry has pointed out, it is this abstractness from perceptual quality that accounts for the peculiarly elusive and monotonous effect of Swinburne's poetry. Swinburne's preoccupation with simple sensational tone might well furnish opportunity for the expression of true synesthesia and such we seem to find. Light and music are used as almost interchangeable terms. He sings of sounds that shine, and of song visible. His is the line: "Light heard as music, music seen as light." Swinburne was, however, influenced greatly by modern French tendencies, so that it is possible that such exchange of sound and light is merely literary.

A survey of Shelley's poetry shows that he makes use of odor terms in a peculiar way, in description of things visual and auditive. Sometimes, light and music are blended in his similes; the song of both the skylark and of the nightingale are described in pictorial

terms. Usually, however, his comparisons are too deliberate to evidence any confusion. The same statement may be made in general of Keats's taste and touch analogies. These poets delighted, as it were, in embellishing their figures with a favored form of imagery.

The sense-analogies of William Blake are more difficult to qualify. He has, for instance, an odd way of describing things heard in terms of things seen. Unlike Swinburne's transfer of qualitative words, Blake's shift is at the perceptual level rather than at the sensational, as when he speaks of a virgin clothed in sighs.

Tonal vision—a very rare form of synesthesia—is frequently imitated in these poetic analogies. So too is olfactory vision and olfactory audition, of which, so far as I am aware, no actual experience is on record, although the latter is a favorite form of phrasing among musical critics who imitate synesthetic effects. Sound described as light occurs, but usually without suggestion of colored audition except in the use of the vague color-adjectives silver and gold. The nearest approach to synesthetic phrasing of this sort comes in Swinburne's line,

> "Fine honey of song-notes, goldener than gold."

But in actual experience, colored audition is the most common form of synesthetic experience.

On the whole, the evidence for the prevalence of synesthesia among poets is ambiguous. In order to weigh the matter more thoroughly the question may be raised as to the esthetic and affective values of synesthesia as a literary device. To test this the following experiment was made. Thirty-four fragments, the phrasing of which was synesthetic, were chosen from the 5 poets mentioned above—Poe (3), Swinburne (9), Shelley (11), Keats (4), Blake (7)—and were included among 100 poetic fragments used in a test on the imaginal, affective, and esthetic reaction to poetry. Twelve subjects served in determination of the imaginal and affective reactions to these fragments. The esthetic and affective values were obtained by using the group method of finding the average position of each fragment in the series as a whole. For this last determination 6 subjects served. The fragments were arranged in 8 groups for each of the 2 series of judgments.

A survey of the average position given each of the 100 fragments on the basis of their pleasantness shows that 20 of the synesthetic fragments are to be found in the first 50, or more pleasant group; 14 in the second 50, or less pleasant group. There is, then, a slight indication of the pleasantness of such fragments. On the other hand, if we take the 20 most pleasant fragments and the 20 most un-

pleasant, we find that the first group contains 5 and the second 7 synesthetic fragments. 5 is a trifle under, 7 about equal to what we would expect from a chance distribution. In two of the pleasant fragments of the former group, moreover, the synesthetic element is very slight. It does not appear, then, that synesthesia as a literary device is particularly pleasing. The objection may be raised that with familiarity these fragments might become more pleasant, since repetition would overcome the strangeness, and perhaps unpleasantness, of the phrasing. But in a series of repeated judgments there was little evidence for this view, since as many synesthetic fragments waned in affective value as waxed.

A survey of the average position of each fragment of the 100 in the esthetic series shows 16 synesthetic fragments in the first 50, and 18 in the second 50, a very even distribution. But there are 8 synesthetic fragments in the first 20, 9 in the last 20; in both cases a trifle above the expected number. It would appear, then, that synesthetic phrasing has slightly more influence upon the esthetic than upon the affective judgment.

The M.V. upon the synesthetic fragments is no greater than upon the whole series of fragments. But both for the whole series and for the synesthetic group the M.V. is greater for the esthetic judgment than for the judgment of pleasantness. This shows that the former judgment is even more subjective than the latter.

Some cases of striking discrepancy between the affective and esthetic judgments may be noted. Here we may quote a Swinburne fragment which is held to be of high esthetic value, although very unpleasant. It reads:

> "And swordlike was the sound of the iron wind."

The following from Keats:

> "O turn thee to the very tale,
> And taste the music of that vision pale,"

is given a very much lower place on the esthetic than on the affective scale. There are only 2 fragments in the 100 esthetically inferior to this; but there are 41 that are more unpleasant. One of the two non-esthetic fragments spoken of in the preceding sentence is Shelley's line,

> "And music from her respiration spread
> Like light."

This fragment, again, is less esthetic than pleasant. On the first scale it occupies the one hundredth or last position; but there are 33 fragments held to be more unpleasant.

A survey of the reports shows, however, that each poet must be

considered separately and in connection with the imaginal reports from the reagents. Of the 12 reagents who gave these reports, only 3 showed any tendency to synesthetic experiences. Of these, one (B) shows a pronounced case of colored gustation. Although he had never previously, so far as he could recall, experienced colored audition, during the test he reported such transfer, always in imaginal terms. Another reagent (D) has experienced colored audition occasionally and uses color-thinking to some degree. A third (E) during the course of the test was found to translate sound into terms of sight with great frequency. The reports of these subjects are of particular interest.

The Blake fragments were, without exception, on the average, both unpleasant and of slight esthetic value. His description of the auditory in visual terms is felt to be ridiculous or unmeaning, as in the line,

> "And all thy moans flew o'er my roof, but I have called them down."

Translated into definite imagery, this fragment becomes absurd, as was reported by one reader to whom the moans appeared as pigeons. A slight blurring of the imagery so that merely vague flying creatures of some sort are seen renders the imagery more supportable.

The lines,

> "Sweet moans, dovelike sighs,
> Chase not slumber from thine eyes,"

again bring visual personification of one sort or another. D, who finds the fragment more pleasing than do the other subjects, is the only one who reports a literal translation. The vaguely outlined moans and sighs, evanescent visual flashes of gray, are felt brushing the eyelids in a faint flicker.

These illustrations may serve as examples of Blake's tendency to translate his thoughts into terms of vision. Much more successful than such attempts are those in which he surrenders to sound. The laughing cadence of certain of his verses for children gives almost the effect of auditory hallucination; the laugh itself resounds through the verse. Blake, it is said, was not only poet, painter, and seer, but also musician.

Poe's phonism of the approaching night, his readers usually find unmeaning or else understand it as descriptive of the sound of thunder borne on the wings of the storm-cloud, an interpretation which suggests the possible origin of the experience. Several call the phrasing incongruous and, in general, it is not pleasing.

Poe gives no other example of clear-cut synesthesia and offers few instances of striking sense-analogies. Once he forms a pretty conceit

of a goddess's song carried to heaven as odor and he describes the sparkling Echoes that flow through the door of the Haunted Palace in terms of visual personification. This latter description pleases his readers exceedingly. Every reagent makes a more or less poetic picture; two of them do so in striking synesthetic fashion. E writes, "Through the open door is streaming waves of white, blue, and pink light, which I hear as soft sweet music." And B reports, "I see a beautiful door to a palace and pale blue and darker blue lights flash from it."

Movement vivifies Poe's imagery to an extraordinary extent. He delights in wingèd odors, floating banners, ethereal dances. This preoccupation with movement affects even his description of things auditory. He images a gush of melody welling from sounding cells; he sings of floating ditties and of groans that float; and in "Lenore,"

> "No dirge will I upraise,
> But waft the angel on her flight with a pæan of old days!"

This intimate union of vision and movement brings it about that such descriptions of sound in terms of movement evoke frequently a visual interpretation. Sometimes even a complete translation of sound into vision is effected, as by one reader (E) of the line quoted above who saw the music following the angel in a stream of light. Such translation by Poe of sound into movement and a retranslation by the reader into visual terms perhaps best explains the fact that the reports on Poe show a greater number of synesthetic translations than do those on any other poet.

Swinburne's synesthetic phrasing, although often reported to be unmeaning, derives so much beauty from its association with melodious words and rhythmic cadences that the reader, preoccupied with the delight in sheer word-music, often surrenders all demand for meaning. Swinburne's frequent attempt to render song visible is, however, rarely successful, although there are readers who make the transfer, as E who images the visible music as tiny motes flying in the sunlight and B who sees the blue, not of the sky, but of the music, shining through rifts in fleecy clouds.

Keats was not particularly successful in his synesthetic fragments. The most effective is that in which he sings of the "velvet summer song" of the wind, lines apt in the arousal of tactile imagery. The most noted of his synesthetic fragments is the one reading,

> "Lost in pleasure, at her feet he sinks,
> Touching with dazzled lips her starlight hand."

It is significant that the one reagent (D) who made an almost hallucinatory translation of the fragment into light localized on the lips

is the one reader of the fragment who finds it highly pleasant. Other reagents comment frequently upon the incongruous phrasing.

The statuesque quality of much of Keats's imagery, in contrast to the dance and buoyancy of Poe's flitting visions, exemplifies his preoccupation with the tangible. Poe often describes sound in terms of movement; Keats, on the other hand, frequently conceives music as tangible, material, as in the wonderful lines—lines which yet perplex many readers—

> "A haunting music, sole perhaps and lone
> Supportress of the faery-roof, made moan
> Throughout."

Shelley's synesthetic fragments, with a few exceptions, are exceedingly pleasant. The French exponents of literary synesthesia are fond of quoting a celebrated passage from Shelley as evidence of the translation in his mind of music into odor. It reads,

> ". . . music so delicate, soft, and intense,
> It was felt like an odor within the sense."

And in another place he sings,

> "Thine old wild songs which in the air
> Like homeless odours floated."

Not only is music translated into fragrance, but also, in turn, odor is described in visual terms. Thus the odors that lie visibly above the flowers suggest the vision of tiny clouds that carry the perfumed incense of flower and forest.

The many forms assumed by Shelley's odor-similes suggest that the conversion is literary, not spontaneous. Readers frequently react to them with olfactory images, in themselves highly pleasant.

Shelley affords also many beautiful illustrations of the exchange of light and sound. The two fragments quoted below were given high esthetic and high affective value by nearly every reader.

The first has reference to the coming morn:

> "Hear I not
> The Æolian music of her sea-green plumes
> Winnowing the crimson dawn?"

And the other:

> "This is the mystic shell;
> See the pale azure fading into silver,
> Lining it with a soft yet glowing light;
> Looks it not like lulled music sleeping there?"

There is, too, a noteworthy description of the nightingale's song in terms of the bird's circling movements.

In general, as has been stated, Shelley's readers find such com-

parisons most beautiful. They do not often make the translation he suggests, but they find their imagery enriched by all manner of delicate connotations. Where, for instance, the silver and azure of the mystic shell are said to be like lulled music, one does not translate color into sound, but surrenders, instead, to a delightful relaxation such as is induced by soft music, or else one visualizes the shell to the accompaniment of orchestral strains or to that of the ocean-murmur resounding faintly in the shell's pale whorls. Again, one may not hear the Æolian music of the dawn, but may see, instead, the wind pluming itself among the dawn-clouds or may hear the sighing of the morning breeze. The descriptions are at once of things seen and heard together, and therefore the appropriateness of the double imagery, as in the line,

"Whose waters like blithe light and music are."

By the description of the nightingale's song cited above, Shelley has actually succeeded in arousing in many readers a synesthetic experience, an interpretation of the song as circling light. E writes, "I see the music as rings of light twist up into the sky where suddenly they break and fall to the ground in a shower of stars."

Such a cursory review as the above of a few chosen poets leads to the conclusion that while there is very slight evidence that the chosen poets experienced true synesthesia, there is some justification in concluding that they enjoy, more than the ordinary reader, analogies between the senses. It may be stated as a principle of interpretation that if a given transfer of sense-qualities is found pleasing only when the reader makes the suggested translation easily and spontaneously, there is some evidence that the writer himself used the analogy spontaneously rather than reflectively unless the expression be purely conventional. Put differently, an analogy that the average reader finds forced and unmeaning probably represents a peculiar but natural, rather than reflective, mode of thought for the poet. We may, then, interpret Swinburne's tonal vision, Poe's phonism of the night, Blake's visions, and Keats's "dazzled lips" as due to individual idiosyncrasies, while Swinburne's organic toning of phrases, Poe's kinesthetic analogies, Keats's tactual imagery, and Shelley's odor and auditive similes are literary and imaginative in significance.

Synesthesia may, it should be observed, be systematic, that is, constant in appearance under given conditions, and uniform in quality, or it may be sporadic, occur, that is, only occasionally. While synesthetic experiences are not pathological, yet it is known that they may result from stimulation by drugs or accompany the excitement of fever. It would not then be impossible for the poet in the fever of inspiration to experience a subtle confusion of the senses,

that would lead to spontaneous synesthetic phrasing, incomprehensible to the average reader.

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REVIEWS AND ABSTRACTS OF LITERATURE

La Pensée et les nouvelles écoles anti-intellectualistes. ALFRED FOUILLÉE. Second edition. Paris: F. Alcan. 1911. Pp. xvi + 415.

This work, the first edition of which seems to have been exhausted almost immediately, is of less interest to the American than to the French public. Its object is twofold: first, to claim for its author the priority in certain psychological and metaphysical theories which have been generally ascribed to Guyau, Nietzsche, James, and Bergson; and, secondly, to show that voluntarism, pragmatism, and (mystic) intuitionalism, wherever they have departed from the lines he had laid down, have fallen into serious error. It also contains a brief exposition of the author's own theory of the nature and functions of thought.

The claim to priority is based principally upon "La Liberté et le Determinisme," which appeared in 1872, and the proof is as convincing as such proofs usually are. In Fouillée's comprehensive eclecticism (or synthesis, as he himself would say) all the historical types of philosophy are merged; and it would be difficult indeed to invent an "ism" which he could not claim to have in some sort anticipated. The points of comparison are of a very general character, all that is individual and distinctive in the various theories being set aside as error. And meanwhile the further question, how far our author himself had been anticipated, is left untouched.

To denote the fundamental principle of his philosophy, Fouillée here, as in other recent essays, uses the phrase, "will to consciousness," formed after the analogy of the "will to live" and the "will to power." The most primitive datum of a reflective self-consciousness is, he declares, consciousness itself—not a blank "awareness," but a consciousness full of concrete content of sensations, feelings, impulses, ideas, etc.; ever changing and ever looking for change, and especially looking forward to change which it, by its own feelings, ideas, and efforts, shall initiate or control. Thus the reflecting subject is conscious of himself as *will;* will, moreover, not for a life that shall be insensible or unconscious, for then it would be of no interest to him, but a life *for himself.* His will is essentially a *will to consciousness.* Its object is always to maintain or increase the functions of conscious life. These functions are comprised in three principal functions, which are, however, inseparable: thought, feeling, and action. This is the "law of idea-forces": that the affective and the intellectual life are inseparable. It is by means of this law that Fouillée undertakes to bring together the portions of truth in all the various systems—intellectualistic, mystic, voluntaristic—of his time.

In the obtaining of these first principles, Fouillée professes to employ a strictly "immanent," experiential method, simply and plainly describing the most obvious features of conscious life without addition, selection, or criticism. Opinions will, of course, differ as to the justice of his professions. To me they seem to be far from well founded. Instead of describing fact he seems to me to be manipulating conceptions. That all desire is, at bottom, directed toward one's own future experience is not affirmed upon introspective evidence, nor is the further theory, that at all times thought, feeling, and action go together; or, at any rate, no sufficient account of any such evidence is presented.

What makes these theories attractive is the synthesis to which they lead. "Every purely intellectualistic system loses itself in a consideration of the objective, which admits only things that are more or less external and relations that are more or less extrinsic, without showing the ground which gives character to these objects, and still less the life of the conscious subject himself. On the other hand, every system that is purely voluntaristic or sentimental loses itself in an exclusive consideration of the subjective, which does away with both objective reality and objective truth. And so it has always seemed to us essential to rise above the two contraries" (p. 3). Accordingly Fouillée is an uncompromising intellectualist, and at the same time an uncompromising voluntarist. He stands ready to grant their full claims to reason and heart alike.

The volume is too rich in detail to admit of even a scant summary within the limits of a brief review. The constructive part contains, I believe, no notable addition to the author's system. As I have said, the exposition is decidedly brief; and for that reason it will be found useful by those who wish to gain a rapid insight into the "philosophy of idea-forces."

The critical part, as well as the abundant critical suggestions which are contained in the constructive part, strikes me as being of very uneven value. Both its best and its weakest points are expressive of the author's notable good sense and balance of judgment. He lays bare the characteristic weaknesses of men with unfailing skill. But where good sense and judgment, joined with a fine analytical ability, are not sufficient, where a bold imagination is necessary for the proper appreciation of new and striking views, there Fouillée is disappointing. Poorest of all are the notices of Poincaré and his "new philosophy of the sciences," this for the special reason that the author's knowledge of mathematics is very limited and superficial. His attempt to prove the necessary truth of the axioms of Euclidean geometry is of a kind to be very much regretted. The treatment of pragmatism is also disappointing. It adds nothing new to the controversy; and like most French essays on the subject, it attributes a great deal to the pragmatists which they have not dreamed of claiming. The following extract, which summarizes a section, is typical. "... It is certain that pragmatism contains an essential contradiction. It holds that the intellect is only a means of voluntary action upon nature. But one can not act upon nature and *provide* thus for the satis-

faction of human feelings, except as he can *foresee;* provision and prevision are inseparable. Intelligence, to be a means of action and feeling, ought therefore to be first of all a means of knowledge and to have a truth-value. If, as we ourselves have maintained, theoretical knowledge and practical efficiency are in direct ratio with each other, or rather are one and the same thing under two aspects, that is no reason for denying the *cognitive* side of ideas" (p. 288).

The notices of Bergson are widely scattered through the volume, and are generally without mention of his name. By far the most important is a long study of "intuitionalism" which occupies the last place in the work, and to which the remainder leads up as to a climax. Fouillée shows with admirable clearness what varied elements the intuition of Bergson embraces: the general consciousness of bodily life; the fleeting impression of the momentary state of mind; a confused and condensed memory; the spontaneous consciousness of one's own existence; introspection; sympathy; instinct; constructive imagination. And he proceeds to show how poor an organ of philosophy this many-sided faculty is; that instead of being superior to the scientific intellect it is altogether inferior to it; that instead of being above criticism, as giving us a direct revelation of the reality of ourselves and of other things, it stands in the utmost need of criticism from every point of view.

Fouillée writes admirably. Though now an old man, he still retains the facility and grace of earlier years. There is little of the poet in him; but he gives occasional evidences of a flashing wit. One bon-mot is worth remembering: "The Chantecler of the poet claims that it is his morning song that causes the sun to rise; the 'new philosophy of the sciences,' so close to pragmatism, attributes almost the same honor to its 'decrees'; it causes truth to rise."

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Thought and Reality in Hegel's System. GUSTAVUS WATTS CUNNINGHAM. Cornell Studies in Philosophy, No. 8. New York: Longmans, Green, and Company. 1910. Pp. v + 150.

This very readable monograph defends the thesis that Hegel's philosophy neither lends itself to the charge of "intellectualism," of equating things with mere abstract thought about things, nor justifies the many attempts made by his critics to define reality in irrational terms, as sheer immediacy over which thought can play superficially, but into whose heart thought can not penetrate. The author sees clearly that any such identification of Hegel's philosophy with an abstract intellectualism, and the consequent appeal to the supposed immediacy of fact or feeling, rests upon a conception of thought which Hegel did his best to overcome. This *non*-Hegelian doctrine of thought, wrongly attributed to Hegel even by so sympathetic an interpreter as McTaggert, is the doctrine that "thought is a mediating activity among other mental processes—which bear to it an external relation" (p. 73). Whoever thus interprets Hegel's doctrine

of thought will suppose, in view of his identification of thought and reality, that Hegel absurdly equates reality with the process of formal knowledge, that he transfers "the wealth of the factual world and the glory of it" into "the poverty of general principles and universal laws" (p. 85). Such an interpretation will also imply that in asserting the supremacy of the Notion, Hegel held, as McTaggert puts it, "that the highest activity of spirit, in which all others are transcended and swallowed up, is that of pure thought," that the legitimate activities of will and feeling are suppressed. Again, such an interpretation of Hegel's doctrine of thought makes it easy to ridicule the supposed transition from the logic to the world of nature and of mind, "the deduction of existential reality from abstract universals" (p. 67). Moreover, classic misconceptions of Hegel's account of negation rest at bottom upon attributing to him this false doctrine of thought. Haym's supposition that according to Hegel the essence of things consists in their being contradictory, the criticism of Trendelenburg that pure thought is always an affair of sheer identities and therefore can not involve any real opposition and negation, and McTaggert's contention that negation loses import as the dialectic advances, these views all rest on the supposition that "Thought" in Hegel's system is the thought of formal logic, always dealing with an external content.

As against such an interpretation of Hegel's doctrine of thought, Dr. Cunningham holds that Hegel understands by the Notion "not abstract and formal cognition, but organized experience" (p. 71); that the apparent transition from the logic to nature and mind "was attempted for purely schematic purposes"; that the so-called transition is only a change in point of view because "the logic, the philosophy of nature and the philosophy of mind are only three points of view from which one organic whole is observed and interpreted" (p. 58). When thought is thus regarded as the whole life of mind, it is not so palpably vicious to hold that philosophy is the highest expression of spirit, since "philosophical knowledge always means more than mere abstract cognition; it is an immediacy which includes within itself the whole life of spirit" (p. 89). And such an account of thought makes it possible to hold that the individual is significant and unique, not because of any irrational immediacy, but through rational (not formal) definition.

In the last chapter the author defends the interpretation of the Hegelian absolute as a self-conscious individual, differentiated from the world and from all finite existence precisely because "consciousness always demands a content from which it is differentiated" (p. 144).

Dr. Cunningham rightly insists that the *Phenomenology* must be reckoned with as well as the *Logic* in the final interpretation of Hegel's philosophy. He might have added that the early theological writings are not without significance in estimating the drift of Hegel's doctrine of thought.

Unquestionably an important motive in the contemporary revival of Hegel studies, of which this monograph is an important symptom, is the

belief that Hegel's attempt to deepen the concept of thought is highly significant for us to-day when so much of our philosophy is drifting either towards an irrationalism or a realistic doctrine of consciousness, remote from the real life of thought.

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JOURNALS AND NEW BOOKS

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NOTES AND NEWS

Henri Poincaré

On July 17, the death of Henri Poincaré deprived the world of, perhaps, its foremost genius. In the address delivered at his funeral, *Nature* quotes M. Guist'hau, Minister of Public Instruction, as saying of him:

"His powerful spirit came into touch with every problem and threw fresh light upon each. He was one of those rare figures in the history of mankind who, by bringing together fragmentary or isolated facts, ideas, or observations, can raise themselves to a conception of the universe, can study its constitution and evolution, and can fathom even its variations. With the help of this force of investigation, which extended to everything, he studied the laws of the intellectual, as well as of the physical world, and philosophers, mathematicians, and astronomers, recognized in him their master."

The breadth of his interests can best be shown by quoting from the speech of M. Frederic Masson, on the occasion of M. Poincaré's election to the Académie Française, in 1909:

"M. Poincaré is a very vast mind. He is remarkable for both the diversity and the profundity of his learning. He is a geometer as well as a physicist and astronomer, pursuing these sciences rather by the application to them of analytical methods than by simple observation and experimentation. His interests, thus, have been largely in the fields of mathematical physics and celestial mechanics.

"As a geometer, his works concerning the theory of numbers, integral calculus, and the general theory of functions may be found in more than one hundred and fifty communications published in the *Proceedings of the Academy of Science* and in as many articles published in mathematical journals of France and other countries.

"While professor of mathematical physics, at the University of Paris, he published fourteen volumes of lectures on light, electricity, thermodynamics, and the propagation of heat. He popularized in France, while perfecting them, Maxwell's theories which were later proved by the experiments of the great German physicist, Herz.

"In the field of astronomy, Poincaré showed great originality, and his studies upon the form taken by a fluid mass in rotation and subjected to

the laws of universal gravity led to the formulation of many interesting and important theories regarding the separation of the earth and the moon, and the formation of the variable stars. By revising the calculus of LaPlace he was able through further investigation to establish the theory formulated in 1784 concerning the stability of the solar system."

Furthermore, the volumes that bring together certain prefaces to scientific works and articles published in reviews present M. Poincaré as a philosopher of no mean order. The analyses of scientific concepts, found in "Science and Hypothesis," which form the basis of the work, are reconsidered in the light of their relation to reality, in the "Nature of Science," and there established in a noteworthy contribution to the problem of the nature of knowledge.

Certain extracts from a third work, not yet translated into English, "Science et Méthode" will show both the psychology of the investigator and the motivation of his life.

"The scientist does not study nature because to do so is useful; he studies it because he takes pleasure in it, and he takes pleasure in it because it is beautiful. If nature were not beautiful, it would not be worth knowing, and life would not be worth living." "It is the search for the special beauty, the sense of harmony of the world, that makes us choose facts most suited to contribute to this harmony, as an artist chooses, among the features of his model, those which complete the portrait and give it character and life." "And it is because simplicity, because grandeur is beautiful, that we investigate by preference simple facts and great facts, that we take pleasure now in following the gigantic course of the stars, now in scrutinizing with the microscope that prodigious littleness, which is also a grandeur, and now, in seeking through geological time the hour of a past which draws us because it is remote." "But this disinterested investigation of truth for its peculiar beauty is also healthy and can make man better."

DOCTOR EDWIN D. STARBUCK, professor of philosophy in the State University of Iowa, has been granted sabbatical leave for the coming year, and will reside in Boston. He will act for the year as psychologist adviser to *The Beacon Press* in the publication of children's and young people's literature, and especially in the formation of the graded Sunday School curriculum. His address will be 25 Beacon St.

DR. WILLIAM PEPPER, professor of clinical pathology at the University of Pennsylvania, has been appointed dean of the medical department, to succeed Dr. Allen J. Smith. Dr. Smith will remain professor of pathology, comparative pathology, and tropical medicine.

DR. L. R. GEISSLER (Cornell) has resigned his position as research psychologist in the physical laboratory of the National Electric Lamp Association, Cleveland, to become professor of psychology at the University of Georgia.

IN the last issue of this JOURNAL, Dr. Walter F. Dearborn was referred to as professor in the school of education at Chicago. He should have been referred to as associate professor.